



# The Pre-History of the Commentary Tradition : Aristotelianism in the First Century BCE (Prolegomena to a Study of Xenarchus of Seleucia)

Andrea Falcon

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Résumé de l'article

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# THE PRE-HISTORY OF THE COMMENTARY TRADITION : ARISTOTELIANISM IN THE FIRST CENTURY BCE (PROLEGOMENA TO A STUDY OF XENARCHUS OF SELEUCIA)

Andrea Falcon

Department of Philosophy  
Concordia University, Montreal

*RÉSUMÉ : Au 1<sup>er</sup> siècle av. J.-C. Aristote fit l'objet d'une étude textuelle intense. Cette étude mena à terme à une appropriation des outils conceptuels élaborés dans ses écrits. Dans le cas de Xénarchus, les outils pertinents concernèrent la théorie aristotélécienne du mouvement, avec un accent mis sur les concepts de lieu naturel et de mouvement naturel. Xénarchus remania la théorie aristotélécienne du mouvement de manière à rendre superflu le corps céleste simple. Sans nier que certaines de ses opinions doivent être comprises à la lumière des débats de la philosophie hellénistique tardive, je prétends que sa façon de lire présuppose une distanciation par rapport à Aristote qui est caractéristique de la philosophie post-hellénistique.*

*ABSTRACT : In the first century BCE Aristotle was subject to an intense textual study. This study eventually led to the appropriation of the conceptual apparatus developed in his writings. In the case of Xenarchus, the relevant apparatus was Aristotle's theory of motion, with an emphasis on the concepts of natural place and natural motion. Xenarchus reworked Aristotle's theory of motion so as to make the celestial simple body expendable. While I do not deny that some of his views are best understood in light of the debates of late Hellenistic philosophy, I contend that his textual engagement presupposes the distance from Aristotle that is characteristic of Post-Hellenistic philosophy.*

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## INTRODUCTION

Alexander of Aphrodisias (second half of the second century and first half of the third century CE) is rightly regarded as the champion of Aristotelianism in antiquity. Alexander refers to himself as a teacher.<sup>1</sup> He was a teacher of Aristotelian

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1. *De fato* 1,18-2,2 Thillet.

philosophy concerned not only with explicating the text of Aristotle but also with defending Aristotle in the context of the ancient debate between schools. This context is essential for a full appreciation of Alexander's loyalty to the philosophy of Aristotle. It was this loyalty coupled with the finesse of his interpretation that gained Alexander his reputation as the most authentic interpreter of Aristotle. His commentaries set standards of interpretation that remained largely unsurpassed in antiquity. But it is important to realize that this extraordinary accomplishment was the culmination of an exegetical tradition that had started a few centuries before Alexander.<sup>2</sup> In this paper I will focus on a particular segment of this exegetical tradition : the Aristotelian tradition in the first century BCE.

The intense exegetical activity that took place in this century eventually developed into a new form of literary production : the philosophical commentary. For this reason, I will refer to this period as the pre-history of the commentary tradition. I hasten to add that I do not mean to suggest that the philosophical commentary was the privileged mode of exegetical expression in the first century BCE. Although meager, the surviving evidence suggests that the study of Aristotle took different forms and did not imply codification in the form of the philosophical commentary.<sup>3</sup> Moreover, this study did not involve the acceptance of Aristotle's doctrines. It is true that Aristotelianism came to be associated with a certain set of doctrines, including spe-

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2. This does not mean that the Alexander's interpretation of Aristotle is always best understood as the continuation of this tradition. A case in point is Aristotle's essentialism. Alexander developed his interpretation of this doctrine in light of the middle books of the *Metaphysics*. But in so doing he consciously broke with the previous exegetical tradition, which started from, and was centered on, the *Categories* (see footnote 3). While the interpretation developed by Alexander was presumably richer and subtler than anything produced before him, one should not lose sight of the fact that Alexander moved away not only from the *Categories* but also from the biological works. So, especially in light of the increased awareness of the role that biology played in shaping Aristotle's thought, one might see Alexander as having set the interpretation of Aristotle on the wrong track. See M. RASHED, *Essentialisme. Alexandre d'Aphrodise entre logique, physique et cosmologie*, Berlin, Walter de Gruyter, 2007, p. 30-31, who refers to R.W. SHARPLES, "Species, Form and Inheritance : Aristotle and After," in A. GOTTHELF, ed., *Aristotle on Nature and Living Things : Philosophical Studies presented to David M. Balme*, Pittsburgh, Mathesis Publications, 1986, p. 117-128. Cf. SHARPLES, "Some Thoughts on Aristotelian Form : With Special Reference to *Metaphysics Z 8*," *Science in Context*, 18 (2005), p. 93-109, especially 107, n. 43.

3. Consider the exegetical activity on the *Categories*. It is fairly clear that writing commentaries is the exception, not the rule, in the first century BCE. We have the names of five ancient interpreters of the *Categories* whose activity is placed in the first century BCE : Andronicus, Boethus, Athenodorus, Ariston, and Eudorus (SIMPLICIUS, *In Cat.* 159.31-33). It is likely that, of these five philosophers, only Boethus of Sidon wrote a commentary on the *Categories*. Simplicius contrasts his "word-by-word exegesis" to that of Andronicus, who is said "to have paraphrased the *Categories*" (SIMPLICIUS, *In Cat.* 29.28-30.5). We cannot exclude that Simplicius projected his own literary conventions onto Andronicus and Boethus, and that *by his own standards* Boethus and Andronicus were engaged in two different exegetical exercises. On the one hand, there is some clear evidence that Andronicus did rephrase and clarify Aristotle's text in order to extract Aristotle's intentions. On the other hand, there is no reason to think that Andronicus wrote in the style that will later be codified as paraphrase. Themistius was the champion of this particular form of exegesis in antiquity. It is telling, I think, that Themistius does not give us names of predecessors. Fortunately, it is not essential for us to establish whether or not Andronicus was the first paraphraser of Aristotle. What matters is that his style of exegesis was perceived as different from that of Boethus. We know very little about Eudorus, Ariston, and Athenodorus, but it is not likely that their exegetical activity on the *Categories* took the form of a commentary. For an informative survey of the early exegetical activity on the *Categories*, I refer the reader to J. BARNES, "Les catégories et les *Catégories*," in O. BRUUN, L. CORTI, ed., *Les Catégories et leur histoire*, Paris, Vrin, 2005, p. 11-80.

cific physical doctrines. But this does not seem to be true at the beginning of the Aristotelian tradition. There does not seem to be a definite set of doctrines that defines Aristotelianism at this very early state of the tradition. What the ancient interpreters<sup>4</sup> shared was not a body of doctrines but a practice, namely the practice of reading and interpreting Aristotle's work.

It is often assumed that this practice was made possible by the editorial activity that culminated in the production of the first reliable edition of Aristotle, the Andronican edition.<sup>5</sup> In reality, Andronicus of Rhodes could not be entirely responsible for the return to the text of Aristotle that took place in the first century BCE. There is evidence that this revival was, at least in part, independent of his editorial accomplishment. His edition of Aristotle may be taken as a reflection of a more general phenomenon. It may even be regarded as the effect rather than the cause of a change of attitude. It is notoriously difficult to say what exactly changed and why. I favour the explanation that appeals to the notion of *auctoritas*.<sup>6</sup> What motivates someone like Andronicus to return to Aristotle is the conviction that Aristotle was a philosophical authority and as such his works deserved to be studied carefully. But this does not mean that Aristotle was above criticism. Quite the contrary : we will see that the exegetical activity on his text could result in a rejection of some of the most significant among Aristotle's doctrines. This appeal to the notion of *auctoritas* as an indication of the change will not satisfy everyone. For one thing, it does not solve, but rather shifts, the problem one step back. We still do not know what caused the change of attitude which resulted in an intense exegetical activity conducted on the crucial assumption that Aristotle was an *auctoritas*. In a recent article, David Sedley has suggested that the Mithridatic War (89-84 BCE), including Sulla's capture of Athens (86 BCE), created enough disruption to generate a sense of discontinuity with the past.<sup>7</sup> According to Sedley, the decentralization of philosophy is a conspicuous characteristic of philosophy in the first century BCE. This decentralization was in part independent of the Mithridatic War, but it gained new impetus from these tragic events and eventually resulted in a radically new philosophical world in which Athens was no longer the centre of gravity. As a result of this, philosophical schools such as the Peripatos ceased to be institutions based in Athens but continued to exist in the form

4. I borrow this expression from SIMPLICIUS (*In Cat.* 159.31 : παλαιούς ἐξεγητάς). The important word is ἐξεγητάς. Again, this word is evidence about the nature of the activity that defined the return to Aristotle in the first century BCE ; it is not evidence that this activity was codified in the form of the philosophical commentary.

5. In passing, I note that we know very little, virtually nothing, about Andronicus and his edition of Aristotle. For a brilliant survey of the relevant sources, I refer the reader to J. BARNES, "Roman Aristotle," in ID., M. GRIFFIN, ed., *Philosophia Togata II*, Oxford, Clarendon Press, 1997, p. 1-67.

6. This explanation is sketched in M. FREDE, "Epilogue," in K.A. ALGRA, J. BARNES, J. MANSFELD, M. SCHOFIELD, ed., *The Cambridge History of Hellenistic Philosophy*, Cambridge, 1999, p. 782-785. For an attempt to use the notion of *auctoritas* to the anonymous commentary on the *Theaetetus*, see D.N. SEDLEY, "Plato's *auctoritas* and the Rebirth of the Commentary Tradition", in J. BARNES, M. GRIFFIN, ed., *Philosophia Togata II*, Oxford, Clarendon Press, 1997, p. 110-129. As Sedley rightly points out, there is no Greek counterpart for *auctoritas*.

7. D.N. SEDLEY, "Philodemus and the Decentralisation of Philosophy," *Cronache Ercolanesi*, 33 (2003), p. 31-41.

of philosophical sects (αἰρέσεις). The collapse of the Athenian schools and their transformation into philosophical sects would also explain the necessity to go back to the works of the founding fathers of the schools, including those of Aristotle and Plato. Although this explanation may not persuade everyone, it has at least one important merit. It helps us to understand that the return to the works of Aristotle which took place in the first century BCE was symptomatic of a more general phenomenon. This phenomenon has been used to mark the transition from Hellenistic to Post-Hellenistic philosophy.<sup>8</sup>

## I. XENARCHUS OF SELEUCIA AS A CASE STUDY

In the rest of this paper I will discuss the transition from Hellenistic to Post-Hellenistic philosophy by focusing on Xenarchus of Seleucia as a case study. In antiquity Xenarchus was known as a Peripatetic philosopher.<sup>9</sup> He was originally from Seleucia, Cicilicia, but spent most of his life away from home, teaching philosophy first at Alexandria, then in Athens, and finally in Rome, where he ended up at the court of emperor Augustus.<sup>10</sup> On the basis of this information, Xenarchus' activity can be safely dated to the second half of the first century BCE. The little we know about his life confirms that Athens had already lost the ability to retain the best minds. While Athens was one station in his philosophical career, there is no reason to attach special significance to it. We do not know how long Xenarchus stayed in Athens, but we do know that Xenarchus moved on, and indeed forward, to Rome. Rome, not Athens, was the final destination, and indeed the culmination, of his career as a teacher and philosopher. Also in light of this, it is not only safer but also wiser to think that Xenarchus was a Peripatetic philosopher not because he was a member of the school founded by Aristotle in Athens, but rather because he belonged to the Peripatetic sect.

Although Xenarchus was a Peripatetic philosopher, he is best known (I should say, almost exclusively known)<sup>11</sup> for his vigorous criticism of Aristotle's thesis that the celestial bodies are made of a special simple body, unique to them : the fifth sub-

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8. For a recent attempt to explain the transition from Hellenistic to Post-Hellenistic philosophy using the notion of philosophical authority, see G.R. BOYS-STONES, *Post-Hellenistic Philosophy. A Study of its Development from the Stoics to Origen*, Oxford, Oxford University Press, 2001.

9. JULIAN THE EMPEROR, *orat.* 8 (5) 3 162 A-C (= THEOPHRASTUS, fr. 158 [W.W. FORTENBAUGH, P. HUBY, R.W. SHARPLES, D. GUTAS, *Theophrastus of Eresus. Sources for His Life, Writings, Thought, and Influence*, Leiden, New York, Köln, Brill, 1992]). STOBÆUS, *eccl.* I 320. 5-8 (= AËTIUS IV 3 10) ; STRABO, *geo.* XIV 5, 4, 670.

10. The source of this information is STRABO, *geo.* XIV 5, 4, 670.

11. Although the surviving evidence is meager, and at times frustratingly so, there is no doubt that Xenarchus was concerned with issues of ethics and psychology as well as of physics. In this paper I will limit myself to discussing Xenarchus' criticism of the fifth substance. The sophistication and ingenuity involved in this criticism presupposes a close textual reading of Aristotle's physical writings. This suggests that Xenarchus' activity was firmly rooted in the return to Aristotle which took place in the first century BCE. While I do not deny that some of Xenarchus' views are best understood in light of debates that go back to the Hellenistic period, I will argue that his criticism of the fifth substance presupposes the distance from Aristotle that is characteristic of Post-Hellenistic philosophy.

stance, also known as the fifth body, the fifth element, *quinta essentia*, or aether. From Simplicius (sixth century CE) we learn that Xenarchus wrote a book against the fifth substance. It is not clear whether Simplicius is providing us with the title of the book, giving us information about its content, or doing both.<sup>12</sup> It is impossible to evaluate how many liberties Simplicius took in reporting Xenarchus' words as we are not able to reconstruct a text of Xenarchus' book that is independent of Simplicius' citations. We have to bear in mind that the commentary tradition is by its nature derivative. Each commentator builds on the work done by the previous generations of commentators. Simplicius is no exception to the rule. It is fairly obvious that in a good number of cases (although not in all) Simplicius depends on Alexander for his discussion of Xenarchus' objections.

The polemical nature of Xenarchus' book cannot be disputed. The target is the thesis that the heavens are made of a celestial simple body distinct from and not reducible to earth, water, air, and fire. In all probability, the book consisted of a series of difficulties (ἀπορίαι) or objections (ἐνστάσεις). Xenarchus advanced objections or raised difficulties with the intent to refute this thesis. It is also clear that Xenarchus focused on the arguments that we read in the *De caelo*. It would help if we could say something more specific about the scope of the book or its literary nature. Unfortunately we cannot. But it is very unlikely that this book was written in the form of a commentary.<sup>13</sup>

It would be a mistake to dismiss Xenarchus solely on the basis of the fact that we know little about his life and his work. First, the little we know about his objections

12. The first time Simplicius refers to Xenarchus' book, he writes : ἐν τοῖς πρὸς τὴν πέμπτην οὐσίαν αὐτῷ γεγραμμένοις (*In DC* 13. 22-23). A literal, and indeed neutral, translation could be : "in the things written by him [= Xenarchus] against the fifth substance." This may be a brief description of the subject of the book containing no reference to its title. When Simplicius returns to Xenarchus, he focuses on the second difficulty contained ἐν τοῖς πρὸς τὴν πέμπτην οὐσίαν ἡτορημένοις (*In DC* 21. 33-34). Again, it is not clear whether Simplicius is providing us with the title of the book, or telling us that this book consisted of a set of difficulties raised against the fifth substance, or doing both. The third and final time Simplicius uses the phrase πρὸς τὴν πέμπτην οὐσίαν is hardly conclusive : Ptolemy, Plotinus, and Xenarchus ἐν τοῖς πρὸς τὴν πέμπτην οὐσίαν ἀπορίας, all endorsed a doctrine of natural motion that looks like a revision, or a creative interpretation, of Aristotle's theory of natural motion (*In DC* 20. 10-25). By printing Πρὸς (instead of πρὸς) τὴν πέμπτην οὐσίαν in these three passages, Heiberg fortifies the impression that Simplicius is supplying the title of Xenarchus' book. But it is significant, I think, that in his Latin translation of Simplicius' commentary William of Moerbeke renders the phrase πρὸς τὴν πέμπτην οὐσίαν in three different ways. Obviously, he does not take it to be a title :

- ἐν τοῖς πρὸς τὴν πέμπτην οὐσίαν αὐτῷ γεγραμμένοις = *in libris scriptis ab ipso de quinta essentia* ;
- ἐν τοῖς πρὸς τὴν πέμπτην οὐσίαν ἡτορημένοις = *in dubitatis circa quintam essentiam* ;
- ἐν ταῖς πρὸς τὴν πέμπτην οὐσίαν ἀπορίας = *in dubitationibus adversus quintam substantiam*.

Even if we decide that Simplicius is giving us the title of the book, we should be cautious about projecting this title back to Xenarchus. First, Simplicius is our only source for the putative title. Second, the ancient authors are known to be casual, if not careless, about their titles : there is no reason to think that Xenarchus is an exception.

13. Again, thinking about the ancient exegetical tradition on the *Categories* can be useful here. This tradition suggests that it was not unusual to collect objections or difficulties. For example, Athenodorus wrote a book entitled *Against Aristotle's Categories*. Lucius and Nicostratus would do the same more than one hundred years later. Cf. SIMPLICIUS, *In Cat* 1.18-20 : "[o]thers have chosen simply to present a series of difficulties (ἀπορίας) arising from the text, which is what has been done by Lucius, and after him by Nicostratus, who took over for himself the job of Lucius" (translated by Michael Chase).

to Aristotle's doctrine of the fifth substance indicates that Xenarchus was a sophisticated reader of Aristotle's physical writings. It is often assumed that this level of sophistication was made possible by the editorial activity that culminated in the production of the first reliable edition of Aristotle, the Andronican edition. The lack of evidence linking Xenarchus to Andronicus or his edition of Aristotle suggests caution. It is safer, I think, not to make Xenarchus' exegetical activity contingent upon the availability of any particular edition of Aristotle.<sup>14</sup> Second, an important segment of the commentary tradition in antiquity and beyond found its orientation by dealing with his criticism of Aristotle's doctrine of the fifth substance. His objections to Aristotle's view on the material composition of the heavens became an integral part of this tradition thanks to Alexander of Aphrodisias and his (lost) commentary on the *De caelo*. Alexander recalled these objections in order to demolish them. Subsequent generations of commentators did the same. Simplicius is no exception to the rule. When Simplicius discusses Xenarchus' objections in his commentary on the *De caelo*, he is following Alexander and building on his defense of Aristotle. By this time Xenarchus acted like an outsider within the commentary tradition. This explains why Xenarchus is not described as a Peripatetic philosopher by Simplicius. Embedded in the pro-Aristotelian exegesis of Alexander,<sup>15</sup> Xenarchus turned out to be anti-Aristotelian. In reality, Xenarchus was neither pro- nor anti-Aristotelian. He was simply impervious to this dichotomy.<sup>16</sup>

Xenarchus remained an outsider until the very end of the Aristotelian tradition. We find Xenarchus' objections in John Buridan, Albert of Saxony, and Nicole Oresme. The Aristotelian tradition continued to find its orientation by dealing with his objections until the very end. It is significant, I think, that Cesare Cremonini, a

14. If Andronicus' editorial labor could be safely placed in the first half of the first century, the conjecture that Xenarchus relied on the Andronican edition would become more plausible. Unfortunately, the precise chronology of Andronicus is disputed. Some scholars are inclined to date Andronicus' editorial activity to the first half of the first century BCE, perhaps in the 60s — H.B. GOTTSCHALK, "Aristotelian Philosophy in the Roman World from the Time of Cicero to the End of the Second Century AD," in H. TEMPORINI, W. HAASE, ed., *Aufstieg und Niedergang der römischen Welt*, Vol. ii 36.2, Berlin, Walter de Gruyter, 1987, p. 1095-1096, reprinted with some additions and revisions in R. SORABJI, ed., *Aristotle Transformed: The Ancient Commentators and their Influence*, Ithaca, Cornell University Press, 1990, p. 55-81 — or in the late 70s — P. MORAUX, *Der Aristotelismus bei den Griechen*, Vol. 1, *Die Renaissance des Aristotelismus im I. Jh. v. Chr.*, Berlin, Walter de Gruyter, 1973, p. 45-55. The problem with this inference is that it crucially depends on a piece of information preserved by Philoponus. Philoponus makes Andronicus the teacher of Boethus, whose activity can be safely dated to the second half of the first century BCE (*In Cat.* 5.18-19). It has been argued that nothing certain was known about Andronicus by the time of Ammonius and Philoponus — L. TARÁN, "Aristotelianism in the 1<sup>st</sup> century BC," *Gnomon*, 53 (1981), p. 721-750, reprinted in ID., *Collected Papers*, Leiden, Köln, Boston, Brill, 2001, p. 479-524, here p. 495-497. But if nothing certain was known about Andronicus in late antiquity, how can we establish the date of his edition of Aristotle? There is one line of argument that places his editorial activity in the 30s. Although Cicero was well informed about the philosophers of his time, Cicero never mentions Andronicus or his edition of Aristotle. Cicero's silence has led some to date Andronicus' edition of Aristotle after the death of Cicero (43 BCE), and most likely in the 30s — for example, I. DÜRING, *Aristotle in the Ancient Biographical Tradition*, Göteborg, 1957, p. 420-425. By placing this activity in the second half of the century, the possibility that Xenarchus used the Andronican edition is not ruled out.

15. I borrow the expression "pro-Aristotelian exegesis" from a forthcoming article of R.B. TODD.

16. I have already argued that, at least in the 1<sup>st</sup> century BCE, engagement with Aristotle's works did not imply commitment to Aristotle's doctrines.

friend and colleague of Galileo Galilei at Padua wrote a *Defense of the Fifth Substance of the Heaven against Xenarchus, John Philoponus, and Others* in 1616. Last but not least, Galileo himself recalls one of Xenarchus objections at the beginning of his *Discorso sopra i due massimi sistemi del mondo*.

## II. XENARCHUS' THEORY OF NATURAL MOTION

Xenarchus was not content with offering a series of objections or difficulties. There is evidence that his criticism of Aristotle implied a positive doctrine of natural motion which was intended as a revision of Aristotle's theory of natural motion. It is possible, to some extent, to reconstruct this doctrine.<sup>17</sup>

It is a substantial claim of Aristotle's that a sublunary simple body naturally performs a simple rectilinear motion. If unimpeded, this simple body naturally moves upward or downward until it has reached its natural place. At least for Aristotle, the nature of the simple body is such that it stops moving when it has reached its natural place. Put differently, the nature of the simple body is such that it is at rest when it is in its natural place. Xenarchus consciously departed from this crucial tenet by claiming that a simple body in its natural place either is at rest or moves in a circle. This claim involves a creative interpretation of Aristotle's doctrine of natural motion. Aristotle describes the natural motion of a simple body as a motion "toward its actuality,"<sup>18</sup> or "toward its form."<sup>19</sup> For Aristotle, in other words, the natural motion of a simple body is never an unbounded process. On the contrary, (1) this process always has a starting and an ending point; and (2) the ending point of the process is the culmination or perfection of the process. Xenarchus exploited the thought expressed in (2) in an ingenious way. He introduced the distinction between a simple body and what is becoming a simple body. What is becoming a simple body is a body that is moving in a straight line toward its natural place. This rectilinear motion does not count as a case of natural motion because the simple body that is away from its natural place has not fully realized its nature. The motion this body eventually performs once it has reached its natural place is natural. Note, however, that there is only one motion that can count as natural motion: the circular motion that the perfected simple body performs once it has reached its natural place. Why? Because this is the only motion that a body can perform without leaving its natural place: circular motion. This means that a simple body that has fully realized its nature is either at rest or moves in a circle.

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17. MORAUX, *Der Aristotelismus bei den Griechen*, Vol. 1, p. 198, remarks that there is some evidence of a positive doctrine in the few testimonies that have reached us. However, he does not develop this remark in the rest of the chapter. The emphasis is on the *pars destruens* of Xenarchus' critique. See, for example, *ibid.*, p. 202-203: "Xenarchus has in no way tried to offer a new doctrine on the nature of the stars in order to replace the Aristotelian hypothesis of the fifth element. [...] His only goal seems to have been a relentless criticism of the Aristotelian theory." Dissatisfaction with this aspect of an otherwise excellent presentation of Xenarchus is already expressed by TARÁN, *Collected Papers*, p. 517.

18. *Phys.* 255 a 29-30.

19. *DC* 310 a 33-b 1.



In sum, Xenarchus' doctrine of natural motion was centered on the following ideas :

- 1) a simple body that is away from its natural place moves either upward or downward ;
- 2) a simple body that has reached its own natural place is either at rest or moves in a circle ;
- 3) fire naturally moves in a circle.

At first sight, Xenarchus made an innocent point : statements about the nature of a simple body should be made with reference to the simple body in its natural place. But this point can lead to a crucial revision of Aristotle's physics. If one of the bodies that we encounter on earth can move in a circle once it has reached its natural place, there is no need to introduce a special body that naturally performs circular motion in order to account for celestial motion. Nobody in antiquity disputed that mobility is a conspicuous feature of fire. If unimpeded, fire regularly moves upward. But what happens to fire when it has reached its natural place ? According to Aristotle, this fire loses its mobility. Xenarchus revised Aristotle's theory of natural motion in a way that allowed him to say that fire does not lose its mobility once it has reached its natural place. According to Xenarchus, this mobility manifests itself in a different and more perfect form, namely circular motion.

### III. HELLENISTIC THEORIES OF MOTION AND XENARCHUS

Since Strato of Lampsacus had abandoned the doctrine of the celestial simple body to return to the traditional view that the heavens are made of fire,<sup>20</sup> it has been suggested that Xenarchus was under his influence, or alternatively that he was influenced by the Stoics.<sup>21</sup> I find these suggestions resistible. First of all, the fact that both Strato and Xenarchus rejected the view that the heavens are made of a body different from earth, water, air, and fire, and that both reverted to the traditional view that the heavens are made of fire, does not suffice to establish the theoretical dependence of Xenarchus on Strato. Second, we know little about Strato's physical views.<sup>22</sup> But the little we know suggests that Strato not only dropped Aristotle's fifth element ; he also modified various aspects of Aristotle's theory of motion. However, these modifications, to the extent that they can be reconstructed, do not point in the direction of the theory of motion subsequently developed by Xenarchus. Rather, they seem to depend on a different conceptual apparatus.

20. STOBÆUS, *eccl.* I 200. 21-22 Wachsmuth (= AËTIUS ii 11. 4 = WEHRLI, *Straton* 84).

21. GOTTSCHALK, "Aristotelian Philosophy in the Roman World from the Time of Cicero to the End of the Second Century AD," p. 1120.

22. For a very helpful presentation of the evidence concerning Strato, see W. CAPELLE, "Strato (der Physiker)," in G. WISSOWA, ed., *Paulys Realencyclopädie der classischen Altertumswissenschaft*, Stuttgart A. Druckermüller, 1931, p. 277-315.

Our sources credit Strato with the view that all bodies, insofar as they are natural, are heavy (have weight) and as such move downward.<sup>23</sup> Fire is no exception to the rule. Of course fire moves upward. But this upward motion is explained by Strato as the result of the causal interaction between fire and the other bodies, which are all heavier than fire. In other words, fire regularly rises on top of everything else not because it is absolutely light, as suggested by Aristotle, but because it is comparatively lighter than anything else. The language preserved in the surviving testimonies suggests that Strato considered the upward motion of fire a case of forced motion : fire is squeezed out and pushed to the periphery of the physical world by the lighter elements.<sup>24</sup> In other words, Strato's theory of motion is centered on the following two ideas :

- 1) all bodies naturally move downward ;
- 2) the upward motion of fire (and air) is nonnatural.

On this theory, the earth is at rest at the center of the universe because it is the heaviest object.<sup>25</sup> Moreover, the heavenly bodies are made of fire because this is the element that is forced to the periphery of the physical world. Finally, since fire has weight, the heavenly bodies are heavy objects, although they are comparatively lighter than anything else in the physical world.

There is emphatically no evidence that Xenarchus endorsed any of these views. For example, Xenarchus did object to Aristotle's definition of lightness,<sup>26</sup> but his objection did not depend on a buoyancy theory of motion.<sup>27</sup> According to Xenarchus, the definition of absolute lightness as that which floats on top of everything does not apply to the fire that we encounter on earth, but only to the fire that has reached its natural place. Xenarchus obviously exploits the ambiguity of the Greek verb *ἐπιπολάζειν*, which has both a static and a kinetic meaning. But this objection ultimately depends on the distinction between simple body and perfected simple body, as well as the claim that the behavior of the simple body in its natural place cannot be inferred from the behavior of what is becoming a simple body. Put differently, this objection makes sense only in a physical theory that employs the notion of natural place and distinguishes the behavior of a body in its natural place from the behavior of a body away from its natural place. While there is no doubt that Xenarchus endorsed the Aristotelian view that there are natural places, and that these places are the final destinations of the rectilinear motion of earth, water, air, and fire,

23. STOBÆUS, *ecl.* 142.19-143.2 Wachsmuth (= AETIUS, *Placita* I 12. 7 = WEHRLI, *Straton* 51). Cf. SIMPLICIUS, *In DC* 267.29-268.4 and 269.4-6 (= WEHRLI, *Straton* 53 and 52).

24. See, for example, STOBÆUS, *ecl.* 142.19-143.2 Wachsmuth (= AETIUS, *Placita* I 12. 7 = WEHRLI, *Straton* 51) : "<According to> Strato, natural heaviness belongs to all bodies, and lighter <bodies> float on top (the Greek is *ἐπιπολάζειν*) of heavier bodies, being as it were squeezed out like pips."

25. Scholion 26 on BASIL, *In exameron* 1.10 (= PASQUALI 24 b = WEHRLI, *Straton* 90).

26. SIMPLICIUS, *In DC* 70. 20-29.

27. I borrow this expression from M. WOLFF, "Hipparchus and the Stoic Theory of Motion," in J. BARNES, M. MIGNUCCI, ed., *Matter and Metaphysics*, Napoli, Bibliopolis, 1988, p. 471-545.

there is no evidence that Strato needed this view. In fact, there is evidence that he rejected it.<sup>28</sup>

As for the Stoics, there is some evidence that links Xenarchus to Stoic physics. But this link is very tenuous. Let us begin with the extant evidence. It is clear that Xenarchus was involved in the discussion concerning the implications of the Stoic definition of void. The debate on the existence and nature of void shaped the Hellenistic debate on the physical world. Different conceptions of void were defended in the Stoic, Epicurean, and Peripatetic schools. Also in light of the relevance and intensity of the discussion, it is not surprising that this debate continued in Post-Hellenistic times. We know that Xenarchus contributed to this debate. In his lost commentary on the *De caelo*, Alexander of Aphrodisias dealt with the Stoic claim that the physical world is surrounded by void. Alexander argued that the very conception of a void outside the world was incoherent.<sup>29</sup> In this context, Alexander discussed Xenarchus' attempt to help the Stoics with a definition of void. Apparently, Xenarchus had suggested changing the Stoic definition of void from "capacity to receive [a body]" to "receptive."<sup>30</sup> Although we cannot rule out that Xenarchus was content with making a conceptual point, the linguistic revision proposed by Xenarchus may be taken as evidence that he endorsed the Stoic doctrine. In this case, there would be a second point of contact between the Stoics and Xenarchus. In addition to the fact that Xenarchus, like the Stoics, rejected the doctrine of fifth body, he would have argued, with the Stoics, for the existence of a limited extramundane void.

This is as far as we can go, I think, in establishing a link between Xenarchus and the Stoics. The problem, as I see it, is that there is no evidence that Xenarchus made use of any distinctively Stoic physical doctrine in his rejection of the Aristotelian doctrine that the heavens are made of a special simple body unique to them. It is significant, I think, that Xenarchus' doctrine of natural place and natural motion cannot be understood as a development from particular Stoic physics. Briefly, although the evidence is fragmentary and open to more than one interpretation, it strongly suggests that the Stoics did not accept an Aristotelian theory of motion.<sup>31</sup> Apparently, the Stoics credited all bodies with a natural tendency to move toward the center of the world. According to the Stoics, this tendency is the manifestation of the principle that holds

28. THEMISTIUS, *In DC paraphrasis* 50.37-50.1 Landauer (= Wehrli, *Straton* 53).

29. In this paper I will not discuss Alexander's arguments preserved by Simplicius (*In DC* 285. 27-286. 6). For a recent discussion of these arguments, see A. RESCIGNO, *Alessandro di Afrodisia. Commentario al De caelo di Aristotele. Frammenti del Primo libro*, Amsterdam, Adolf M. Hakkert editore, 2004, p. 466-502. In passing, I note that independent evidence of an ongoing debate between the Peripatetic and the Stoic schools on the existence of extramundane void is preserved by Cleomedes in his *Caelestia*. Cleomedes is responding to a set of objections explicitly ascribed to the Peripatetics that bear some resemblance to the objection leveled by Alexander. I refer the reader to K.A. ALGRA, "The Treatise of Cleomedes and its Critique of Epicurean Cosmology," in M. ERLER, ed., *Epikureismus in der späten Republik und der Kaiserzeit*, Stuttgart, Franz Steiner, 2000, p. 168-173, for a discussion of the similarities and specific differences between the set of objections discussed in the *Caelestia* and the set of objections preserved by Simplicius.

30. SIMPLICIUS, *In DC* 286. 2-3.

31. For a recent, lucid presentation of what we know about the Stoic theory of motion, I refer the reader to D. FURLEY, "Cosmology," in K.A. ALGRA, J. BARNES, J. MANSFELD, M. SCHOFIELD, ed., *The Cambridge History of Hellenistic Philosophy*, Cambridge, U. K., Cambridge University Press, 1999, p. 443-448.

together all the parts of the physical world. For this reason, scholars often describe the resulting downward motion as a centripetal motion. The Stoics seem to have considered this centripetal motion the primary natural motion of each and every body insofar as that body is a part of the whole.<sup>32</sup> Air and fire are no exception to the rule. They too display this natural tendency to move toward the center of the world. The Stoics do not deny that air and fire move upward. However, they consider this upward motion a secondary effect that can be explained by the presence of earth and water in the world. But the fact that air and fire do not disperse in the infinite void surrounding the physical world is a result of the fact that they, like all bodies, cohere with the rest of the world thanks to their natural inclination to the center of the world. The Stoic theory of motion may or may not be a response to Aristotle's theory of motion.<sup>33</sup> But it is difficult, if not impossible, to explain Xenarchus' theory of motion as a development of the Stoic theory of motion. By contrast, this doctrine can be easily understood as a modification of views on natural place and natural motion presented in Aristotle's physical writings.

In sum, there does not seem to be enough evidence to support the view that Hellenistic theories of motion influenced Xenarchus. On the contrary, there seems to be conceptual discontinuity between these Hellenistic theories and Xenarchus' theory of motion. This discontinuity is best explained, I think, by regarding Xenarchus' theory of motion as a direct response to Aristotle's theory of natural motion.

## CONCLUSION

In the Middle Ages, Aristotle's physical writings were regarded as the best guides to the study of the physical world. They offered a coherent, systematic conception of this world which shaped (I should say, dominated) the way people thought of the physical world. This conception of the physical world remained in place until Modern (seventeenth century) Science challenged it. By contrast, in antiquity the fortune of Aristotle's physics was mixed at best.<sup>34</sup>

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32. PLUTARCH credits Chrysippus with this view in *Stoic rep.* 1054 e (H. VON ARNIM, ed., *Stoicorum veterum fragmenta* [= *SVF*], 4 Vols., Leipzig, 1903-1905, here = *SVF* II 550.28-33). ARIUS DIDYMUS, fr. 23 (H. DIELS, *Doxography graeci*, Berlin, 1879, 459.19-450.5; = *SVF* I 99). This Stoic doctrine seems to go back to Zeno. However, see K.A. ALGRA, "Zeno of Citium and Stoic Cosmology: Some Notes on Two Case Studies," in T. SCALTAS and A.S. MASON, ed., *The Philosophy of Zeno*, Larnaca, Municipality of Larnaca, 2002, p. 163-167, for a reminder of the dangers involved in any attempt to isolate Zeno's specific contribution to Stoic physics.

33. On the putative influence of Aristotle's physics on the development of Stoic physics, see D. HAHM, *The Origins of Stoic Cosmology*, Columbus, Ohio, 1997. F.H. SANDBACH, *Aristotle and the Stoics*, Cambridge, Cambridge Philological Society, 1985, challenges this interpretation and argues that the evidence points to the contrary, the Stoics did not show interest in Aristotle's works. J. LONGRIGG, "Elemental Physics in the Lyceum and Stoa," *Isis*, 66 (1975), p. 211-229, draws attention to the points of contact between Stoic physics and the changes and modifications to Aristotle's physics introduced by Aristotle's immediate pupils — most notably Strato of Lampsacus. I am not convinced that the scanty evidence in our possession is sufficient to establish an *explanatory* link between Stoics physics and Peripatetic physics.

34. In fact, those who are familiar with the enormous fortune of Aristotle's physics in the Middle Ages are often surprised by the relative lack of impact that Aristotle's views had on the later tradition. Here is an eloquent expression of such a surprise: "Aristotle's physics is one of the most astonishing systems human

The Aristotelian tradition is especially instructive in this case. By reflecting on this tradition we can appreciate how innovative, audacious, and indeed controversial, Aristotle was as a thinker and as a scientist. From very early on, some of his most distinctive doctrines were strongly resisted. The view that the heavens are made of a special simple body, unique to them, is an excellent case in point. Very few, even within the school of Aristotle, were willing to endorse it. Strato of Lampsacus is a very good example. Although the reasons that led Strato to reject the doctrine of the celestial simple body are not preserved, we can reconstruct a theory of motion that explains why, according to Strato, we do not need this body. This theory marked a significant departure from the doctrine of natural motion advanced in Aristotle's physical writings. The situation did not immediately change in the first century BCE. From Xenarchus of Seleucia we learn that the view that the heavens are made of a special simple body remained difficult to digest. It was received as a view about the existence of an additional body besides earth, water, air, and fire whose theoretical necessity was at best very dubious. Unlike Strato, however, Xenarchus seems to have engaged with Aristotle's theory of natural motion. This engagement resulted in a creative interpretation of this theory.<sup>35</sup> There is at least one aspect in which the comparison between Strato and Xenarchus is illuminating. Both Strato and Xenarchus showed a remarkable degree of independence from Aristotle. They developed different, and mutually incompatible, theories of motion. But Xenarchus's theory is best understood in the context of the Post-Hellenistic return to Aristotle. This theory is symptomatic of a new attitude toward Aristotle's writings. In the first century BCE Aristotle was subject to an intense textual study. This study eventually led to the appropriation of the conceptual apparatus developed in his writings. In the case of Xenarchus, the relevant apparatus was Aristotle's theory of motion, with an emphasis on the concepts of natural place and natural motion. Xenarchus reworked Aristotle's theory of motion so as to make the celestial simple body expendable.<sup>36</sup>

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reason has ever built ; it gave answers to all the questions the ancients had about the heavens and their motions, the elements and their transformations, the most precise and complete answers offered up until then, and all these answers were logically organized in a theory compared to which all prior doctrines seemed to be mere beginnings. That such a system exercised on the minds the powerful seduction that most of the Arabic or Christian philosophers experienced in the Middle Ages, is easy to understand. In contrast, it is surprising to learn that the immediate successors of Aristotle proved themselves to be, in general, rebellious to this influence" (Pierre DUHEM, *Le système du monde*, Paris, A. Hermann, 1913, Vol. 1, p. 242, my translation).

35. A study of the reception of Xenarchus' doctrine of natural motion in antiquity goes beyond the scope of this paper. There is some evidence indicating that this doctrine was quite successful in late antiquity. It was endorsed, among the others, by Plotinus and Ptolemy. Cf. SIMPLICIUS, *In DC* 20. 10-25. More on the fortune of Xenarchus' doctrine of natural motion in late antiquity in A. FALCON, "Plotinus on Celestial Motion," *ISNS Quebec City Conference Anthology* (forthcoming).

36. Thanks to Bob Sharples and Bob Todd for commenting on drafts of this article.